Math is so much fun, and you don’t get too many opportunities to explore **true** mathematics. The point of this POW is to allow you to explore something about mathematics that’s interesting to you. You’ll notice that the tasks are not designed to be extremely difficult!

**Problem of the Week: Exploration!**

Rodriguez/Geometry/Algebra 2/Algebra 1

**EXPLORATION OPTIONS:**

**Your job**: Pick **ONE (1)** of these explorations. The directions are located within each box. **You will turn this in on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. You must get your topics approved by Rodriguez by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. There will be TWO CHECK-IN DAYS on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Extra credit can be given for a second exploration and/or presenting your POW (discuss with Rodriguez).**

|  |  |
| --- | --- |
| Read 4 articles about mathematics or a mathematician from a legitimate news source.   * Print out the articles. * Read and annotate the articles. * Come up with 4 good, critical questions you have after reading each article. These four questions should focus on things you didn’t know before reading the articles.   Then, **for EACH article, write a 1-page response paper** in response to/exploring **ONE (1**) of the four questions you came up with after reading the articles.(So: four pages total.) | Did you find patterns interesting? Do you like creating things? Go to [Visual Patterns](http://www.visualpatterns.org/) (visualpatterns.org), visit the gallery to see what other students came up with, and then generate your own patterns.  You must ***physically create*** **TWO (2)** of your own ***ORIGINAL*** patterns—just the first three terms. (Get creative!)  Then, submit your physically created patterns and a formal write-up of both (Rodriguez will explain the write-up format). |
| * Watch the 3 videos you pick.   Go to Vi Hart’s youtube page (http://www.youtube.com/user/vihart) and find **THREE (3)** videos that spark your imagination.   * Create something that sparked your interest after watching each video (maybe recreate a drawing? Physically create something she discussed?). * Write a 3-paragraph description of the mathematics behind the thing you created. | “How many unique English tweets are possible?” If you like hypotheticals, go to *xkcd’s* [what if](http://what-if.xkcd.com/archive/) (<http://what-if.xkcd.com/archive/>) archives and find a hypothetical that interests you and has math involved.  Pick **TWO (2)** of *what if* you were intrigued by and do a write-up of: (a) what drew you to the hypothetical, (b) what you found interesting about the solution, (c) whether the solution made sense, (d) what you were confused by in the solution, and (e) what the situation makes you wonder. Each write-up must be 1 page.  Then, create **ONE (1)** “what if?” question of your own and write up a solution of it—in a similar xkcd style. |
| One vibrant online community is the [*math stack exchange*](http://math.stackexchange.com/) (math.stackexchange.com) “a question and answer site for people studying math at any level and professionals in related fields.” It has a number of higher-level math questions, but you can find high-school level questions too.  Go to this site and find **FOUR (4)** interesting questions and some answers for them. Frequently asked questions (http://math.stackexchange.com/questions?sort=frequent)might be of interest. Submit the problem, the answers, and a short description of what you understand about the problem and the solution. 1-page minimum per response.  Alternatively, if there is a question about mathematics that you’ve been wondering but never understood (e.g. what does 00 mean, really?), post it and see if someone responds. Submit your question, and any responses you get (if any).  Note: much of the material on that site is very advanced, but it’s an EXCELLENT way for you to see what REAL mathematics is all about. Don’t be afraid to read through it all and try to make sense of it—do research, talk with me, etc.  ***Make sure you check in with Rodriguez about your choice of question.*** | Math Munch is a ridiculously addictive weekly digest of the mathematical interesting on the internet. Go to the [website](http://mathmunch.org/) (mathmunch.org) and browse the archives. There are a number of things that will have you DO, MAKE, WATCH, READ, and PLAY. Find **FOUR (4)** things that interest you.  DO: work on a puzzle, or solve a problem, or struggle with a problem – then turn in a POW-style write-up.  MAKE: re-create a piece of math art, or create your own artwork inspired by the original work  WATCH: watch a video and write 2 paragraphs about what you learned and what questions you have  READ: read about a mathematician, write down why this mathematician was interesting to you and what you learned about him/her (at least 2 paragraphs), and compose two questions you’d like to ask this person  PLAY: play a math video game and then write a critique of it (likes, dislikes, suggestions, etc.) **For each of these, print out the original post and include your work (your solution, art, comment, critique, etc.)** |

|  |  |
| --- | --- |
| **Dr. James Tanton’s Mathematical Curiosities**  Go to Dr. James Tanton’s youtube page (<http://www.youtube.com/user/DrJamesTanton>) and find **THREE (3)** videos that spark your imagination. Then, follow the same directions for the Vi Hart assignment:   * Create something that sparked your interest after watching each video (maybe recreate a something he did? Physically create something he discussed?). * Write a 3-paragraph description of the mathematics behind the thing you created.   \*\*If you pick this option, please see Rodriguez ASAP to discuss things you can create. | ***SOMETHING ELSE?***  Do you have some other mathematical thing you’re interested in doing… or that you’re already doing? Is there something about math that you really, really want to explore or learn more about? Are you reading a book about a mathematician/mathematics? Do you want to research something because you find it interesting? Great! Check in with Rodriguez and we can design an assignment... |

**GRADING**:

* This POW **is worth 20 points.** [rubric forthcoming] ***The more effort you put in = the higher the grade you’ll get.*** Remember: ***you need to appropriately challenge yourself.*** If you just take the easy way out, it’ll be very clear, and that will be reflected in your grade/Rodriguez will deny your choice.
* The point: have fun and learn something new. There are cool things out there. ***You learn AND get more out of something if you challenge yourself.*** You can obviously come see Rodriguez during tutorial if you need help or want to discuss what you’re doing.
* You can get extra credit if you give a presentation on the day that the final exploration is due. ***Please let Rodriguez know NO LATER THAN THE SECOND CHECK-IN DAY if you plan to this.*** (Otherwise you won’t be able to do it.) You will need to provide an outline of your presentation and submit it to Rodriguez beforehand.
* ***ON EACH CHECK-IN DAY, you must bring with you***: (a) all progress you’ve started (at least 1 option complete for explorations that require multiple submissions) and (b) printed out copies of any articles, pictures, patterns, etc. There’s no guarantee we’ll have computers available, so hard copies of these things will need to be with you just in case. ***Not being prepared for check-in day AND/OR not working on your POW because you didn’t have hard copies of your materials = automatically not being able to revise this POW, and will count as 0/10 for a draft on either day.***

**ADVICE:**

1. If you have NO IDEA how to begin or what to do, you need to see Rod ASAP. Waiting too long to ask for help OR not doing it because you’re confused (and didn’t ask for help) doesn’t help anyone and, really, is a silly thing to do.

2. This POW requires heavy use of the Internet.

* ***If you know you’ll have limited Internet access, see me ASAP (as in: today, the day this POW was assigned).*** Saying a few days before the POW is due that you didn’t have Internet access but you didn’t actually talk with Rod about it = not an excuse.
* If you look on any websites for research, questions, answers, etc., **YOU MUST CITE YOUR SOURCES!** Write down all links.

3. Keep an open mind. There are cool, fun things out there, and if you see this as a drag, then yes, the assignment will be a drag. There’s always something new to learn! Math is an ever-changing discipline with so many interesting things to investigate and do.